

## **MEECE Workshop Report San Sebastian** *A combined workshop on model parameterisation and model coupling*

**16/17<sup>th</sup> June 2011**

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### **Introduction**

A joint workshop between WP's 2, 3, 4, & 5 was held in San Sebastian following the MEECE project meeting, which combines milestones M24 and M27. The purpose of the meeting was to ensure we have robust and working links between WP2, 3, 4 & 5 drawing on the presentations made during the main MEECE meeting we elected to discuss the following topics;

1. Ecotoxicological parameterisations
2. Progressing WP5 /links with rest of the project
3. Regional downscaling methods
4. Fishing Scenarios
5. MEECE model atlas

The workshop operated as a mixture of both plenary sessions and breakout groups. The actions from the discussion are reported below.

### **1. Working group on ecotoxicological parameterisations. M St John Hamburg**

This discussion group focus on the analysis of experimental work in WP1 to deliver model parameterisation for exotoxicology to WP2. The following actions we established

#### **1.1 U Piedmont:**

- State of the art with/ meta analysis with respect to our understanding of the effects of toxins on marine organisms from cell chemistry to populations try to identify model parameterization modifications in particular influences on individual and species vital rates e.g. growth, survival, behaviour..... biomarker influence on vital rates ...ie. scope for growth. energy balance.
- Detailed description of experimental activities performed in MEECE
- Based on Experimental activities Identification of parameters for modification in models from IBM to ecosystems.
- Identification of equation modifications. ie. scaling of growth survival for potential application in MEECE models

#### **DUE July 15th to Mike St John**

### **1.2 U Bologna**

- State of the art/ meta analysis with respect to understanding of the effects of toxins on phytoplankton dynamics
- Detailed description of experimental activities performed in MEECE
- Identification of resultant parameters for modification in models from IBM to ecosystems.
- Identification of equation modifications. i.e. scaling of growth survival for potential application in MEECE models

**DUE July 15th to Mike St John**

### **1.3 SDU**

- State of the art/ meta analysis with respect to understanding of the effects of toxins on HTL dynamics
- Detailed description of experimental activities performed in MEECE
- Identification of resultant parameters for modification in models from IBM to ecosystems.
- Identification of equation modifications. ie. scaling of growth survival for potential application in MEECE models.

**DUE July 15th to Mike St John**

### **1.4 U Hamburg**

Compile and summarize fit to template as well as produce the module contribution based on the above.

**Due to PML August 1st.**

**Mike will as soon as the parameterizations are received circulate code (in discussion with Yuri) to interested modellers George; Corrina; Marco; Yuri (In the loop)**

## **2. Working group on progressing WP5: G Piet IMARES**

### **2.1 WP2-4 link to WP5**

- Update the Meta-datatable:
  - Which indicators can actually be delivered
  - For which can the variation due to other drivers be established
- Provide time-series of indicators and relevant processes
  - Past (Hindcast) + validation
  - Future + uncertainty and under climate scenarios
- Confidence in output of the models in terms of their relevance to inform management: critically review assumptions, uncertainty etc. (what criteria?)
  - Critical evaluation of applicability of these models in a management context
  - Relevant space-/time scales + skill
- Atlas?

Possible challenges if resources allow

- Relationship pressure (e.g. fisheries/pollution, NIS?) and indicator(s) under various environmental (e.g. climate) scenarios
- Reference levels indicators
  - e.g. pristine: no human impact
  - Sustainable human impact (i.e.  $F=MSY$ )
- Response time ecosystem (indicators) to management intervention

### **2.2 WP5 forward**

- Task 5.1:
  - Finish deliverables 5.1 (IMARES, AZTI, HCMR) and 5.2 (IMARES, DTU, CEFAS, UCap, UPied, UClup)
- Task 5.2/5.3:
  - Review fisheries management strategies (IMARES)

- Review management strategies of other drivers (eutrophication, pollution, alien invasives)
- Assess how these management strategies affect other GES descriptors
  - Which available models can be used to evaluate specific strategies?
- Develop HCRs/eHCRs based on an understanding of the climate effects on the environment and the processes that determine population dynamics
- Task 5.4:
  - Applicability of IndiSeas indicators in and MSFD context
  -

### 3. Working group on regional downscaling methods: J Holt NERC

The working group discussed the different downscaling methods which were introduced by the speakers to WP3 & WP4. In most regions the IPSL global climate model will be used to provide the climatic forcing. However, the downscaling method selected differed significantly for the MEECE regions.

The downscaling methods could be group into 3(4) different methods (Link to corinnas presentation (with equations)):

- Direct forcing
- Delta change approach
- Linera bias correction or statistical downscaling (nonlinear)

#### 3.1 Direct forcing

$$\Phi_f(x,t) = \Phi_{IPSL\_f}(x,t)$$

$$\Delta\Phi = \Phi_{IPSL\_f}(x,t) - \Phi_{IPSL\_ref}(x,t)$$

#### 3.2 Delta change approach

$$\Phi_f(x,t) = \Phi_{ref}(x,t)F(x,t^*)_{IPSL}$$

$$F(x,t^*) = \Phi_{IPSL\_f}(x,t) / \Phi_{IPSL\_ref}(x,t)$$

$$\Delta\Phi = \Phi_f(x,t) - \Phi_{ref}(x,t)$$

Other possibility: Additive delta change, but problems with negative values

#### 3.3 Linear of statistical nonlinear bias correction

$$\Phi_f(x,t) = \Phi_{IPSL\_f}(x,t)B(x,t^*)$$

$$\Phi_{ref^*}(x,t) = \Phi_{IPSL\_ref}(x,t)B(x,t^*)$$

$$B(x,t^*) = \Phi_{ref} / \Phi_{IPSL\_ref} \text{ or}$$

$$B(x,t^*) = f(x,t, \Phi_{IPSL\_ref}, \Phi_{ref}) \text{ or}$$

$$\Delta\Phi = \Phi_f(x,t) - \Phi_{ref^*}(x,t)$$

#### 3.4 Other issues

The group discussed moreover also other issues, these were:

- The choice of the reference run: ERA40, NCEP and climate model regionalisations were used
- The use of the global global climate model chosen

- Consistency ocean-atmosphere conditions
- Consistency climate forcing when bias correction, delta change approach
- Employing different climate model projections (AR4, Ensembles, AR5)
- 20yrs vs centennial integrations

A strategy document will be developed among the partners to identify a main MEECE downscaling strategy which will be followed by most of the partners. However, there might be scientific justifications which will require the implementation of a different strategy for a region.

#### 4. Working group on Fishing Scenarios: C Smith HCMR

##### 4.1 Reviewed the A1, B1 scenarios (From J. Pinnegar Meece 2010 Bologna presentation)

###### A1 World Markets - Markets First

- *Decommissioning subsidies reduced*
- *Fewer legal and technical restrictions*
- *Fish from the cheapest sources*
- *Only a few high-tech boats*
- *Heavily depleted fish stocks*
- *Rapid expansion of fish farming*

At the least, food species require management with an overall approach using  $F_{pa}$  (could also be seen as where we have been coming from). It was noted that in theory  $F_{pa}$  is a limit and not a target.

###### B1: Global Community - Sustainability First

- *Yield vs. environmental impact*
- *Fish from sustainable sources worldwide*
- *Effective effort-based control system*
- *EU/international marine strategy*
- *Resources allocated to 'natural' predators*
- *Seabed set aside for nature conservation*

##### 4.2 Discussed different types of $F$ (targets and limits)

All species should be treated sustainably; with an overall approach using  $F_{msy}$  (could also be seen as to where the current policy is taking us to).

#### Considerations

##### Scenarios

- Standard: Business As Usual (existing  $F$  values: perhaps should be  $F_{msy}$  but have been traded off to higher levels for particular species in particular areas)
- A1:  $F_{pa}$
- B1:  $F_{msy}$

##### Data poor areas

Qualified estimates: if one value known, apply ratio from known species to get the other value, or expert opinion.

$F_{pa}$  and  $F_{msy}$  are quite close and might not offer enough contrast for the models (scenario runs might not differentiate well), but they are still seen to be the important parameter values to run and base the 2 fishing scenario

##### Encourage the modellers to run additional parameterisation:

- runs with higher  $F$  values  $F_{lim}$ , max historic  $F$ ,
- runs with differential  $F$ -values, e.g. apply  $F_{msy}$  to main food species and a high  $F$  value ( $F_{lim}$ ?) to all other species - this is equivalent to managed food stocks with quotas and non quotas on industrial fishing stocks

- runs with zero F to represent no fishing or recovery (although not what a “pristine” system might be like)
- Where possible, Fmsy model outputs from runs of future (e.g. climate) scenarios

## 5. Plenary Discussion on how to develop the atlas: X Irogien AZTI

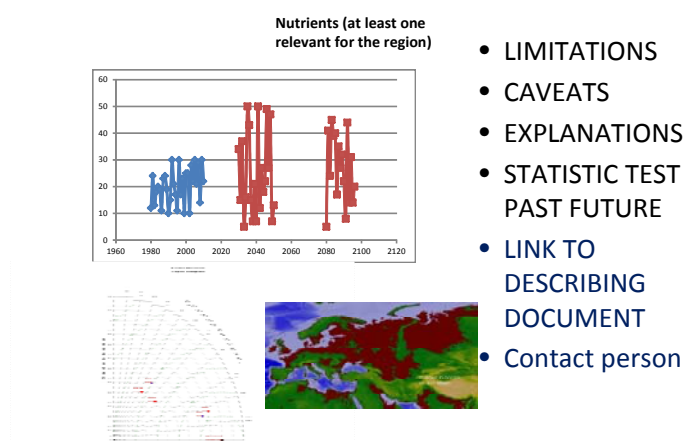
A plenary discussion was held to outline the structure and content of the atlas deliverables in WP5. The discussion led to the following conclusions:

- Baseline of information for lower trophic for all regions – decide the core attributes
- Showcase some of the different models, show a few promising outputs
- Get a balance in covering a range of descriptors
- Re visit the indicator spreadsheet for what we can really do, how comfortable are you with what you have

Agreement to revisit indicator list (used to drive model library) agreed in 2010 and to check its relevance and applicability in present day

The following was also discussed but no firm conclusion drawn:

- Map atlas as part of model library tool....
- Map indicators on to the atlas based on model library search options



Schematic of the atlas contents

## Workshop participants

<b>Participants</b>	<b>Institute</b>
Alessandro Dagnino	UPiedmont
Briac Le Vu	IRD
Chris Smith	HCMR
Corrina Schrum	UiB
Emanuela Clementi	UNIBO
George Triantafyllou	HCMR
GerJan Piet	IMARES
Gisle Nodal	UiB
Icarus Allen	PML
Ivo Grigorov	DTU-Aqua
Jason Holt	NERC
Jerry Blackford	PML
Jessica Heard	PML
Jonathon Beecham	Cefas
Karsten Bolding	BB
Leire Ibaibarriaga	AZTI
Lynne Shannon	UCT
Marco Zavatarelli	UNIBO
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